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ABSTRACT

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Pharmacy State Board Examinations and Practical Experience[1]

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Abstract

The purpose of this preliminary study was to gain insight into what is being measured by the 1974 Washington State Board of Pharmacy Lincensure Examination, and to explore the possibility of using it as a model of tests to evaluate experiential learning. Subjects were 78 examinees from University of Washington and Washington State University. Subject's grade-point average in academic subjects in his/her educational background correlated with the "theoretical" subscores of the test. Thus, it appeared that a candidate's ability to perform in the test situation may influence how well he/she performs on the licensure examination. Conversely, the scores on neither part of the "practical" portion correlated with the grade-point average. Whether a subject had completed a rotating externship was not found to affect performance on the various parts of the examination, however the small numbers of former externs and the fact that their characteristics were not greatly different from other candidates made any conclusions tentative.

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As our education of people for pharmacy practice increasingly becomes concerned with the process taking place outside of the school classroom or laboratory, we find ourselves in need of good evaluative tools. These tools must be developed and tested before educators effectively can plan their efforts and before Boards of Pharmacy effectively can fulfill their certification role.

The state board examination has served traditionally in the certification process, but as one of us (1) pointed out 12 years ago, it had evolved from a test of informal, individualized education often to become only a retest of academic subject matter. The NABP Standardized Blue Ribbon Examination has helped greatly in test design and administration, even if the input from classroom educators continues to overshadow that of the practitioners. The test is unquestionably superior to individual Board members' efforts and does have a more realistic relation to practice than in the past.

We in education recently have been involved with externships, clinical clerkships, and other forms of experiential education. We find that evaluative methods suitable for the school-cloister are not satisfactory for this type of education. We find we are faced with problems similar to those facing the Boards in trying to assess the contribution that this type of education makes to professional development. Our externships are frequently just structured internships, occurring during the schooling process.

The authors believe that the state board examination may be useful in developing evaluative instruments useful to both the Boards and the Colleges. We recognize that the licensure examination is designed to

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measure an adequate level of competence only, while Colleges may wish to differentiate several levels of knowledge and activity. Also, it does not cover the complete range of educational experiences in externships. Nevertheless, it is a start. With the cooperative effort of Boards and Colleges as demonstrated by this preliminary study, hopefully we can gain insight into what is being measured by the licensure examination and the possibility of using it as a model of tests to evaluate experiential learning.

This study is preliminary. That point must be emphasized. Any benefit to examining groups, educators, and candidates will come through sophistication of techniques and careful evaluations during the development process, rather than from the results of this single study.

Description of the Study

The subjects were candidates who took the 1974 Washington State Board of Pharmacy Licensure Examination. Graduates who had completed the University of Washington (UW) externship program were the test subjects. Other graduates of UW or Washington State University (WSU) were the control subjects. The prime object of the study was to determine if differences could be detected between the performances of the test group and the control group on the examination. The test and control groups were of different sizes, and persons in each group had undergone a variety of educational experiences, many of them experiential, during their school years. Our results are therefore only tentative due to lack of numbers and homogeneity of sample treatment. Ideally, both groups would take a test prior to their experience and another after the experience, to give more specific measure of knowledge gained.

Procedures

The Washington State Board of Pharmacy regulations require 1500 hours of internship credit; of these 500 hours are given for graduation from WSU or UW, so for these candidates the remaining 1000 hours are to be satisfied. Three hundred hours are required to be served after graduation and 700 hours may be served prior to graduation. Of the 700 hours, a maximum of 300 hours credit may be given for experiential courses taken in school. The control group and some of the extern test group had satisfied the internship criteria, up to completion of postgraduate experience (700 hours).

The UW rotating externship program has been explained to this group previously (2,3). In 1974 there were 18 students who completed the program (in community, hospital, and on-floor clinical pharmacy service) and were admitted to the examination. For some of these graduates, the time they had spent in the full-time externship was counted for internship credit, so that they could meet the 700 hour minimum necessary to take the examination.

At the 1974 examination, all candidates filled out a supplementary personal data questionnaire which included the questions shown on Table 1.

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Table 1

Supplementary Personal Data

1. What has been your total pharmacy related experience to date?
   Choices: 700-999 hours, 1000-1499 hours, 1500 hours or more

2. How much approvable experience have you had?
   Choices: 700-999 hours, 1000-1499 hours, 1500 hours or more

3. Which of the following describes your use of the 300 hours credit allowed for courses you took in school?
   Choices: None, 1-50 hours, 51-100 hours, 101-200 hours, 201-300 hours

4. Did you complete an externship program?
   Choices: Yes, No

5. Please give your latest cumulative grade point average.

6. From what pharmacy school did you graduate?
   Choices: UW, WSU, Other

7. Have you completed the post-graduate experience part of the internship requirement?
   Choices: Yes, No.

After the examination was graded, the Board of Pharmacy furnished the following percentage scores (unadjusted) from the NABP standardized examination administered to all candidates: Chemistry, Mathematics, Pharmacy, Pharmacology, Practice of Pharmacy (Written Practical), and Errors and Omissions. For this study, none of the candidates were identified by name but the externship graduates were identified by special numbers. There were 18 extern candidates, 60 non-extern candidates.

Data from the questionnaires and the examination scores were analyzed in two ways. First, variables were intercorrelated, where appropriate, using the Pearson Product-Moment method. The magnitudes of the resulting correlation coefficients were tested for significance. Secondly a t-test of differences between means was used to assess the significance of the differences between scores of UW and WSU graduates and between extern and non-extern groups.

Results and Discussion

General Correlations

Since written tests often measure a person's ability to respond in a similar way to a test situation, it is interesting to examine correlations among items that reflect ability as well as subject knowledge. The correlations among items that reflect ability as well as subject knowledge. The correlations among the scores of the licensure examination, grade point average, and pharmacy experiences are presented in Table 2. Those correlations which are significantly different from zero at the 0.05 level are marked with an asterisk.

Table 2

Pearson Product-Moment Correlations

Variable	Chem.	Math.	Pharm.	Pre-Col.	Errors	Pract.	Total Ph.	Approvable	G.P.A.
Licensing Examination									
Chemistry									
Mathematics	0.41*								
Pharmacy	0.45*	0.39*							
Pharmacology	0.59*	0.46*	0.55*						
Errors/Omissions	0.04	0.21*	0.21*	0.14					
Written Practical	0.38*	0.33*	0.40*	0.51*	0.47*				
Experience									
Total Pharmacy	0.01	0.08	0.09	0.14	0.24*	0.32*			
Approvable	0.01	0.15	-0.01	0.19	0.28*	0.23*	0.50*		
Academic									
Cumulative Gr. Pt. Av.	0.37*	0.39*	0.36*	0.40*	0.16	0.19	-0.07	-0.11	

*$p<0.05$

One cannot avoid speculation about the meanings of the findings. Significant correlations were evident among all of the parts of the examination traditionally referred to as "theoretical." Also, the candidate's grade-point average in academic subjects in his/her educational background correlated with these same "theoretical" parts. Thus, it appears that a candidate's ability to perform in the test situation may influence how well he/she performs on the licensure examination.

Conversely, the scores on neither part of the "practical" portion (Errors and Omissions, Written Practical) correlated with the grade-point average. This correlation failure may indicate that the "practical" section is measuring a different ability than just that needed to pass examinations. The correlation between the two parts of the "practical" section indicates that both the Errors and Omission test and the written Practice of Pharmacy test may be measuring similar abilities.

Experience

Total pharmacy-related experience was found to correlate with none of the "theoretical" parts, but did correlate with both parts of the "practical" portion. Approvable experience also correlated with total pharmacy-related experience. Thus, it seems that the "practical" portion of the licensure examination measures abilities gained in experiential learning.

School of Origin

When correlations of test scores with the school at which the candidate received his education were attempted, it was found that Washington State University graduates got higher scores in Chemistry and Mathematics than did University of Washington graduates. Washington State University graduates also listed a greater amount of the 300 hour internship credit for school work for submission to the Board of Pharmacy. Other differences were not significant. (See Table 3.)

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Table 3

T-Test of Differences Due to School of Origin

	WSU Graduates Mean (n=30)	UW Graduates Mean (n=48)	t Value	Significance (p=)
Licensing Examination				
Chemistry	78.4	75.8	2.16	0.034*
Mathematics	87.6	82.2	2.30	0.024*
Pharmacy	73.3	71.6	1.07	0.29
Pharmacology	73.8	71.5	1.14	0.26
Errors/Omissions	81.1	81.2	-0.05	0.96
Written Practical	76.5	74.5	1.39	0.17
Experience				
Total Pharmacy	2.10	2.34	-1.30	0.20
Approvable	2.00	1.62	1.95	0.055
Concurrent 300 hrs.	4.50	3.79	2.37	0.020*
Academic				
Cumulative Grade Point Average	2.84	2.71	1.24	0.22

*$p<0.05$

It is dangerous to speculate as to the causes of the differences in test scores and to attempt to relate them to the educational process in different schools. The differences found, therefore, are simply reported without comment.

Externship Program

Candidates were asked whether they had participated in an externship program. Several WSU graduates thought that they had, therefore it was necessary to check the records and separate those who had completed the UW rotating externship being investigated. Testing these variables for the entire group, we found that former externs did not perform as well as non-externs on Chemistry, Mathematics, and Written Practical, but the

externship graduates had significantly less total pharmacy-related experience than non-externship graduates. Further, the academic grade point averages were not different for the two groups. Since that sampling procedure included WSU graduates who had better test scores in certain subjects than UW graduates, the tests were again done for a sample of only UW graduates. For that UW group, there were found no significant differences between the test scores of extern and non-extern graduates. (See Table 4.) There was a significant difference between the total pharmacy related experience of the two groups. Since the UW externship program was elective, it appears that inexperienced students found the program more attractive. On the other hand, students with a large amount of pharmacy experience apparently perceived less need, or they preferred to keep the jobs they had rather than to be involved full-time in this type of learning experience.

Table 4

T-Test of Differences Due to Externship
(UW Graduates Only)

	Externship Graduates Mean (n=18)	Non-Externship Graduates Mean (n=30)	t Value	Significance (p=)
Licensing Examination				
Chemistry	74.3	76.7	-1.63	0.11
Mathematics	79.5	83.8	-1.40	0.17
Pharmacy	71.0	71.9	-0.44	0.66
Pharmacology	69.9	73.1	-1.50	0.14
Errors/Omissions	82.0	80.7	0.62	0.54
Written Practical	72.8	75.5	-1.38	0.18
Experience				
Total Pharmacy	1.88	2.60	-3.17	0.00*
Approvable	1.65	1.60	0.20	0.84
Academic				
Cumulative Grade Point Average	2.67	2.72	-0.48	0.63

*$p<0.05$

It is interesting to relate these results to a study performed in 1972 by one of the authors (4). In that study, the laboratory class in Prescription Practice was divided into two groups. One randomly selected group received instruction in the school laboratory, and one received instruction in community or hospital dispensaries by pharmacists following specific school guidelines. These two groups of students did not perform differently on either a pre-experience or post-experience test of drug product knowledge. However, the students in both groups who had more than 100 hours of pharmacy experience did significantly better on the tests than those having less. The conclusion from that study was that experience, whether school-controlled or not, contributed significantly to a student's knowledge of drug products. If we note the lack of test score differences in the present report between extern and non-extern graduates, a similar trend is evident in the two studies.

Experience Credit and Board of Pharmacy Practices

Two questions on the Supplementary Personal Data sheet were designed to discover the magnitude of the problem of being able to count only a part of all pharmacy experience that a candidate had. The differences between total pharmacy-related experience and that judged by the candidate as approvable by the Board were studied. Among the candidates, 63% received credit for all the pharmacy experience they had and 37% had pharmacy experience that could not have been approved by the Board. Thirteen percent of the candidates had over 500 hours of pharmacy experience that was not approvable.

One question on the Supplementary Personal Data sheet was asked to determine how the maximum of 300 hours internship credit for school courses was used. The results categorized as to school of origin are shown in Table 5.

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Table 5

Candidate Use of 300 Hour Maximum Concurrent Time

	UW	WSU
None Used	13%	7%
1-50 Hours Used	6	3
51-100 Hours Used	21	0
101-200 Hours Used	28	3
201-300 Hours Used	35	87

Summary

Through the use of candidate data given at the time of the licensure examination by the Washington State Board of Pharmacy, attempts were made to correlate test scores on the NABP standardized examination with themselves, candidate's background, and experience. Of primary interest was the effect of the rotating externship program of the University of Washington on the test performance of the candidates. Numerous interesting correlations were found, and speculations as to their meanings were discussed.

The fact that a candidate had completed a rotating externship was not found to affect performance on the various parts of the examination, however the small numbers of former externs and the fact that their characteristics were not greatly different from other candidates made any conclusions tentative.

Experience gained with this kind of study can be of assistance in development of evaluative methods for experiential learning in pharmacy and to give indications of suitability of the NABP standardized examination in measuring competence. Further studies are desirable for both the Boards and Colleges of Pharmacy.

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